UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Fisheries Center
P.O. Box 271
La Jolla, California 92038

May 20, 2002

CRUISE ANNOUNCEMENT

NOAA Ship: *McArthur*

Cruise Number: AR-02-04

Cruise Title: Northern Pacific Right Whale Study (NORTHPAC)

Study Area: Waters of the Southeastern Bering Sea and Northern Gulf of Alaska

Itinerary: Unless other contingencies arise, afternoon port arrivals and morning departures are assumed.

LEG 1: Depart: 1 July – Seattle, WA	Arrive: 7 July - Kodiak, AK
LEG 2: Depart: 8 July - Kodiak, AK	Arrive: 3 Aug - Dutch Harbor, AK
LEG 3: Depart: 6 Aug - Dutch Harbor, AK	Arrive: 2 Sept - Kodiak, AK

Sponsoring Institution: NOAA/NMFS
Protected Resources Division (PRD), Southwest Fisheries Science Center (SWFSC);
National Marine Mammal Laboratory (NMML), Alaska Fisheries Science Center

Cruise Description and Objectives: The NORTHPAC 2002 cruise is a marine mammal assessment survey of the waters of the Bering Sea. The overall objective of the NORTHPAC cruise is to locate, collect data on, and understand the distribution of Northern Right Whales (*Eubalaena japonica*) which are found in the waters of the study area. Other species to be studied in the Bering Sea and northern Gulf of Alaska include humpback whales (*Megaptera novaeangliae*), fin whales (*Balaenoptera physalus*) and killer whales (*Orcinus orca*). In addition, sperm whales (*Physeter macrocephalus*) will be the focus of research on the Leg 1. The primary objectives include biopsy sampling, satellite tagging (right whales only), acoustic study and photo-identification. In addition, biological and oceanographic data will be collected to better characterize the environment.

Itinerary: The survey is planned to focus on five areas of interest, four of which are decided by historical sighting data for *Eubalaena japonica* . The first, conducted during the transit (leg 1), will be the transit line from Seattle to Kodiak, where acoustic and biopsy sampling will be focused primarily on Sperm Whales. Departing from Kodiak, the second area of interest will be the 50 meter depth curve along Albatross Bank, an area of historical right whale abundance off Kodiak, with some effort planned in the Shumagin Island area on fin and humpback whales. The third area of interest will be in the middle shelf domain of the Southeastern Bering Sea, comprised of a box formed from Latitude 56-30 N and Longitude 162-30 W at its Southeast corner to Latitude 57-30 N and longitude 166-00 W at its Northwest corner. This area will be covered using a transectional pattern of tracklines. The fourth area of interest will be West of the Pribilof Islands, focusing on the shelf area Southwest of St. George Island, and Southward towards Unimak Island. The fifth area is the shelf break North of Umnak Island. Areas two,

three, four and five will all be covered during leg 2 in that order, with the order of coverage reversed for leg 3. In covering these areas the ship will follow predetermined tracklines until right whales are detected. Waypoints will be provided. Tracklines will be regularly modified during the cruise due to the detection of right whales, weather or other considerations.

Synopsis of Scientific Measurements: Scientists will identify and collect data (biopsy, tagging, acoustic, and ecological) on Northern Right Whales and other cetacean species.

Chief Scientist: Dr. Richard LeDuc, SWFSC (858) 546-7072

OPERATIONS

The following operational plans can be considered as a general guide. Weather, operational and scheduling problems, equipment failures, and other unpredictable events may require that these general operations be modified somewhat. This will occur at the discretion of the Cruise Leader (the Chief Scientist's designee).

1.0 DAYLIGHT OPERATIONS

1.1Cetacean Survey - A daily watch for marine mammals will be maintained during daylight hours by scientific observers on the flying bridge (approximately 0700 to 2300), except when the ship has stopped to conduct other sampling operations, or when precluded by weather. Rotating teams of observers will search with 25x150 binoculars, 7X binoculars, and unaided eye. Regular deployment of sonobuoys will constitute acoustic search effort. Sighting conditions, watch effort, sightings, and other required information will be entered into a portable computer that will be linked to the ship's GPS (for course, speed and position information). An “independent observer” may keep a separate watch of animals sighted during the cetacean survey operations, to be compared later with the observer team’s data.

1.1.1 Waypoints - Draft waypoints will be given under separate cover. Points near the coast will be approximate, but the actual survey tracklines will end at the 10-fathom isobath (or at the shallowest safe navigation depth as determined by the Commanding Officer). Tracklines into and out of ports are not shown. It is not imperative that the entire grid of tracklines be covered during the course of the 2-month survey, and the order in which they are covered will be determined by weather and other contingencies. If weather precludes survey, the Cruise Leader may decide to wait at that position for better weather or may direct the ship to another location on the grid based on weather forecasts. The Cruise Leader will be responsible for working with the Command to ensure that the vessel arrives at designated ports at designated times. The Cruise Leader may adjust the scientific activities and length of the nighttime travel to meet scientific and scheduling objectives.

1.1.2 Breaking Trackline - On sighting a marine mammal school or other feature of biological interest, the Cruise Leader or marine mammal observer team on watch will request that the vessel be maneuvered to approach the school or feature for investigation. Biopsy and photographic operations may commence from the bow, based on directions from the Cruise Leader or identification specialists. In some instances, the Cruise Leader will request the deployment of a small boat for biopsy, tagging, photography or other operations (see 1.1.6).

It may occasionally be necessary to divert the ship's course from the established trackline during regular effort due to glare or adverse sea conditions. Also, acoustic detection of right whales, which can occur at a considerable distance, will require diversion from the trackline.The diversions and any subsequent returns to the trackline are at the discretion of the

cruise leader.

1.1.3 Resuming Effort - When the observers have completed scientific operations for the sighting, the ship will resume the same course and speed as prior to the sighting, unless the detection of additional whales warrants further diversion.. The course and speed of resumed effort is at the discretion of the cruise leader.

1.2 Conditions Which Preclude Normal Operations – At times during the cruise visual survey operations will not be possible due to high winds, seas, rain, or fog. Usually, survey operations are suspended at Beaufort Sea State 6 or higher. Also, if fog makes the visibility one nautical mile or less, visual observations are suspended until visibility increases, although acoustic effort may continue. During these times, the Cruise Leader will decide which task to pursue, if any other operations are possible. The weather conditions that would prevent regular survey operations vary somewhat so the Cruise Leader will inform the bridge when survey effort is suspended.

1.3 Acoustics - Acoustic efforts will be primarily focused on detecting and recording cetacean species, with some monitoring of prey mass using backscatter data.

1.3.1 ADCP - The ship's ADCP should run continuously and be logged to a data acquisition system. Complete system settings will be provided by the oceanographer, but will include 5-minute averaging of currents, AGC and 4 beam returns in 60 8-meter bins.

1.3.2 Sonobuoys - Expendable and retrievable sonobuoys may be deployed periodically from either the *MacArthur* or a small boat on an opportunistic basis, at the discretion of the Cruise Leader. With the exception of the small boat, all of the necessary equipment will be supplied and operated by scientific personnel.

1.3.3 Towed Acoustic Array - A hydrophone array will be deployed approximately 250 m behind the ship during most daytime and nightime hours during the transit from Cape Flattery to Kodiak. The hydrophone will be hand-deployed from a box by scientists and will be hand-retrieved only as necessary to conduct biopsy and photo-ID studies (approximately once per day). The ship will be requried to slow down to approximatley 4 kts for retrieval and deployment, but will travel at 10 knots when the array is secured in towing mode. A deck cable will lead from the array to the plot room where listening stations and tracking computers will be set up. Acoustic watches will be maintained 24 hrs a day. A GPS feed will be required to the starboard side of the plot room.

1.3.4 Autonomous Hydrophones – Two autonomous hydrophones with moorings will be deployed from the ship during leg 2. Hydrophones will be deployed by lowering the 400 lb. hydrophone/mooring unit to the surface and then releasing it. For retrieval, an acoustic signal is sent to the unit, which releases the hydrophone from its mooring and allows the hydrophone to float to the surface for pick up. These will be retrieved on Leg 3, along with two others that were deployed on an earlier cruise. All four will be re-deployed in the Northern Gulf of Alaska en route to Kodiak at the close of leg 3.

1.3.5 Backscatter data - The vessel's EQ-50 depth sounder will be operated by the oceanographer, at 38 and 200kHz, to estimate micronekton biomass between 0 and 500 m. We request that the EQ-50 run continuously (day and night). However, this schedule of operation may be changed at the discretion of the Cruise Leader.

1.4 Small Boat Work - A small boat may be necessary for biopsy sampling, satellite tagging and

photography. Deployment will be requested by the Cruise Leader on an opportunistic basis, possibly multiple times in a single day, and possibly two boats concurrently, providing the Commanding Officer determines that operating conditions are safe. The small boat should remain within radar range and radio contact at all times while deployed.

1.4.1 Biopsy Sampling - Biopsies for genetic analyses of marine mammals will be collected on an opportunistic basis. Necessary permits will be aboard the vessel. The animals sampled will either be approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. Samples will be collected from animals within 10m to 30m of the bow of the vessels using a dart fired from a crossbow or a dart rifle. With the exception of the small boat, all gear will be furnished and deployed by the scientific party.

1.4.2 Photography - Photographs of marine mammals will be taken on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be photographed will either be approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. With the exception of the small boat, all necessary gear will be furnished by the scientific party.

1.4.3 Satellite Tagging - Deployment of satellite tags on right whales will occur on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be tagged will be approached by a small boat. Tag deployment is by the use of either a long (8m) carbon-fiber pole or by airgun. With the exception of the small boat, all necessary gear will be furnished by the scientific party.

1.5 Collection of Fish - Fish will be collected on an opportunistic basis at the discretion of the Cruise Leader. While underway, trolling gear will be used when conditions permit and if fishing does not interfere with the towed hydrophone array. While stationary, hook-and-line gear will be used. Fish will be measured, sexed, and stomach contents will be examined and recorded by scientific personnel. The Cruise Leader will be responsible for the distribution of the catch, in accordance with NOAA Administrative Order 202-735B, dated January 9, 1989.

1.6 Collection of Marine Mammals - Marine mammal body parts may be collected on an opportunistic basis at the discretion of the Cruise Leader. This includes pinniped, whale, and dolphin ivory and carcasses. In the event that this occurs, scientific freezer space will be needed to store the mammal body parts. Permits to collect and import marine mammal parts will be present on the vessel. All marine mammal ivory collected will be stored at the SWFSC but may be released on extended loan to recognized research institutions according to existing guidelines.

1.7 Oceanography - Oceanographic sampling will be done by the oceanographer and other designated scientists while underway during the day.

1.7.1 Surface Water Samples - A surface water sample for a bucket temperature will be taken at 0900, 1200, 1500, and 1800 hours local ship time daily.

1.7.2 Thermosalinograph Sampling - The ship will provide and maintain a thermosalinograph (TSG), which is calibrated and in working order, for continuous measurement of surface water temperature and salinity. A backup unit (calibrated and in working order) will also be provided by the vessel and remain aboard during the cruise. A data acquisition system (WinDACS), furnished and maintained by scientific personnel, will be connected directly to the TSG output from the Seabird interface box, via a cable with a 9-pin female d-sub connection (provided by ship). This computer (laptop) will receive the raw data, with the NMEA position string attached to each record. Additionally, the laptop will be connected to the ship's LAN, in order to synchronize with the ship's time server. The ship's Scientific Computing System (SCS) shall also collect this information. The oceanographer will

provide the ship's Operations Officer and Electronics Technician with detailed acquisition information before departure.

2.0 NIGHT OPERATIONS

A chronological record of oceanographic and net tow stations will be kept by the ship (Marine Operations Log) with dates and times in GMT. The ship will provide a printed copy of the marine operations log and cruise weather log to the cruise leader at the completion of the cruise. The main SeaBird CTD system will be provided and operated by the vessel. The collection of oceanographic data, samples, and their processing will be conducted by the scientific party and the vessel's survey tech. The crew of the vessel will operate all deck equipment and be responsible for the proper termination (and any necessary reterminations) of the CTD cable pigtail (provided by the scientific party) to the conducting cable of the winch. All instruments, their spares and spare parts provided by the ship must be maintained in working order and, if applicable, have current calibrations (within previous 12 months).

2.1 CTD Stations - One CTD (conductivity-temperature-depth) station will be occupied each night after survey operations have been completed for the day. CTD data and seawater samples will be collected using a SeaBird 9/11+ CTD with rosette and Niskin bottles fitted with silicone tubing and o-rings (supplied by vessel). The depths of the casts will vary with the bathymetry, with a maximum depth of 1000m. In the Bering Sea middle shelf area, the descent rate will be 10m/min through the pycnocline (approx. 20-40m), then 60m/min after. In other areas, the descent rate will be 30m/min. for the first 100m of the cast, then 60m/min after that, including the upcast between bottles. Most casts will not involve the collection of water samples, with the excpetion of periodic salinity samples to be collected and processed on board for calibration purposes. Cast times are subject to change since the end of daily survey operations will vary during the cruise. Additional CTD stations may be requested by the Cruise Leader in areas of special interest.

2.1.1 CTD Samples - The exact starting time of the CTD will be determined by the FOO or Deck Officer, using the parameters provided by the chief scientist.

2.2 Net Sampling: Net tows will be conducted by the scientific party with the assistance of a winch operator from the vessel. The tows will be on Leg 2 only. The schedule for these tows may vary and may need to be modified by the Cruise Leader.

2.2.1 Bongo Tow - Bongo nets will be towed to a depth to be determined by the oceanographer. The bongo tow will take place after the CTD is completed each night in the third area of interest (i.e., the middle shelf of the SE Bering Sea). Additional tows may be conducted in areas where feeding right whales have been observed. Each tow will take approximately 30 minutes to complete. Specific parameters of the tow (e.g., depth) will be determined by the oceanographer.

2.2.2 Tucker trawl - Tucker trawls will be conducted each night in areas outside the middle shelf (i.e., off Kodiak and along the Bering Sea shelf break), after completion of the nightly CTD. Additional tows may be conducted in areas where feeding whales have been observed. Specific parameters of the tow (e.g., depth) will be determined by the oceanographer.

3.0 AIRCRAFT OPERATIONS

3.1 Aerial Photography - During leg 2 and, if circumstances allow, during leg 3 the ship’s effort will be coordinated with a fixed wing aircraft based in Cold Bay, AK. The goals of this aircraft are to obtain calibrated length measurements by aerial photography to determine age/sex distribution among the right whales photographed, and to obtain photographic idententification of individual right whales.

3.2 Aircraft Communications - The shore-based flight team will communicate with the ship via satellite phone when the aircraft is on the ground and on marine band VHF radio while in the air. While working within VHF range, the aircraft will contact the ship on a regular basis to pass position reports.

SCIENTIFIC PERSONNEL

CHIEF SCIENTIST

The Chief Scientist is Dr. Richard LeDuc, SWFSC, at phone (858) 546-7072. The Cruise Leader is the authorized representative of the Chief Scientist, with all the designated powers and responsibilities of the Chief Scientist.

The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship, (2) exceed the time allotted for the cruise, (3) result in undue additional expense, or (4) change the general intent of the project.

PARTICIPATING SCIENTISTS

Leg 1:

Name[1]	**Position**	**Sex/Org**[2]
Jay Barlow	Cruise Leader	M/SWFSC
Bob Pitman	ID Specialist	M/SWFSC
Jim Cotton	ID Specialist	M/SWFSC
Juan Carlos Salinas	Mammal Observer	M
Miraim O	Mammal Observer	F/Canada
Nathalie Patenaude	Mammal Observer	F/
	Mammal Observer	
Shannon Rankin	Acoustician	F/SWFSC
Julie Oswald	Acoustician	F/SWFSC
Lisa Munger	Acoustician	F/SIO

Leg 2:

Name[1]	Position	Sex/Org[2]
Richard LeDuc	Cruise Leader	M/SWFSC
Bob Pitman	ID Specialist	M/SWFSC
Jim Cotton	ID Specialist	M/SWFSC
Lori Mazzuca	Mammal Observer	F/NMML
Nathalie Patenaude	Mammal Observer	F/
Amy Knowlton	Mammal Observer	F/NEAQ
Eric Archer	Mammal Observer	M/SWFSC
	Mammal Observer	
	Mammal Observer	
????	Oceanographer	NAPP
Kate Stafford	Acoustician	F/NMML
Lisa Munger	Acoustician	F/SIO

Leg 3:

Name[1]	Position	Sex/Org[2]
Lisa Ballance	Cruise Leader	F/SWFSC
Bob Pitman	ID Specialist	M/SWFSC
Jim Cotton	ID Specialist	M/SWFSC
Susan Chivers	Mammal Observer	F/SWFSC
Nancy Friday	Mammal Observer	F/NMML
Jan Benson	Mammal Observer	F/NMML
Adam Jenkins	Mammal Observer	M/SWFSC
Kathy Hough	Mammal Observer	F/NMML
Mikkel Villem Jensen	Tagging Specialist	M/Greenland Inst. Nat. Res.
Alan Sauter	Acoustician	M/SIO
Kerri Danil	Acoustician	F/SWFSC

[1] Will be identified by addendum.
[2] Gender required for berthing assignments; organization for logistics and funding.
*Authorized for per diem at the rate of $, for days at sea.

For all legs, the incoming scientific personnel will board the ship on the day of its arrival in port, the outgoing personnel will stay in a hotel or make other plans.

Government ID Cards - Each member of the scientific party will have government ID cards. Foreign nationals will have a copy of their contract or their invitation to sail on the cruise, as well as the required passport and visa.

MEDICAL FORMS - All scientific personnel will complete a NOAA Health Services Questionnaire (NHSQ) prior to embarking, as per NC Instruction 6000. This form will be routed through MOP Health Services 30 days prior to the cruise.

FACILITIES

EQUIPMENT AND CAPABILITIES TO BE PROVIDED BY SCIENTIFIC PARTY

1. Nine 7x50 hand-held binoculars
2. Four 25x150 binoculars and stands
3. One 20x60 hand-held gyro-stabilized binoculars
4. Three observer chairs for flying bridge
5. Wooden decking for flying bridge
6. Video camera and tapes
7. Three 35mm cameras with lenses, 35mm film
8. Three handheld radios
9. 25-watt marine radio mounted on flying bridge
9. Laptop computers (3) and large storage boxes (clamshells) for marine mammal observers
10. Portable GPS component as backup to ship's system
11. Tucker trawl and equipment for net tow sample preservation
12. Laptop and label printer (9x11x6 in.) for biopsy samples
13. Crossbows, biopsy darts and tips, sample vials and storage solution
14. Biopsy dart rifle and ammunition (.38 caliber blanks)
15. Formalin, sodium borate, and DMSO
16. Bongo nets (including spare) and frame
17. Computers for environmental (WinDACS) and acoustic (ADA) data acquisition
18. Wormley standard seawater vials for salinometer calibration (40 vials)
19. Salinity sample bottles (6 spares)
20. Bucket thermometer holder and thermometer (and 2 spares)
21. Oceanographic data logs and log books
22. X pallets of sonobuoys (5'x5'x5', 1200 lbs when full)
23. Sonobuoy antenna and coax cable
24. Two sonobuoy receivers
25. DAT recorder for sonobuoys
26. Permits for specimen collection
27. Computer data storage media
28. (diskettes, etc.)
29. 10 reams of paper
30. Signal processing and recording system for towed hydrophone array
31. Two autonomous moored hydrophones.

EQUIPMENT AND CAPABILITIES TO BE PROVIDED BY SHIP

We request the following systems and their associated support services, sufficient consumables, back-up units, and on-site spares. All measurement instruments are assumed to have current calibrations and we request that all pertinent calibration information be included in the data package.

1. GPS navigation system
2. Power (including 12 V power, if available) and ship's GPS connection (2 feeds) to flying bridge
3. Canopy on flying bridge
4. Three handheld radios (as spares)
5. Small boats for biopsy sampling and photography
6. Freezer space for biological samples (-70^{o} freezer and walk-in)
7. Hydrographic winch with minimum 400m cable (1/4" to 3/8" dia.) for net tows
8. Termination for SeaBird CTD cable (including Chinese finger and shackle)
9. Bottom depth checking during CTD casts (PTR or other)
10. SeaBird 9/11+CTD system and G.O. rosette, frame with weights, 1.7L Niskins (12)
11. Oceanographic winch with 5/16" conducting wire
12. SeaBird thermosalinograph (SBE21) and connection (9-pin female D-sub for WinDACS)
13. Deck space for Tucker trawl
14. Simrad EQ50 echo sounder w/TVG and synch outputs from both 38 and 200 kHz
15. Salinometer (Autosal 8400) and constant temperature room (20-22□C)
16. Salinity sample bottles (48 ea. - 2 cases of 24 plus spares)
17. Scientific Computing System for data collection (redundant to WinDACS system)
18. Hook-up (CTD) and counter space for SWFSC-supplied oceanographic computer
19. Deck space for one bongo net frame (pair of nets attached).
20. RDI 150-kHz ADCP and data acquisition system.
21. Marine Operations and Deck Log (electronic)/Weather Observation sheets, filled out by Deck Officers
22. Installation of SWFSC-supplied sonobuoy antenna and coax cable
23. Exterior storage space for X pallets of sonobuoys (see item 52 above)
24. Copy Machine
25. Additional email computer for scientific email use in Chem Lab.
26. Deck space and hydraulic hookup for acoustic winch
27. LAN connection to main lab (4) and 1 to flying bridge (to be used for time server)

INSTALLATION AND MAINTENANCE

Prior to departure from Seattle, the Chief Scientist and members of the scientific party may board the vessel, with permission of the Commanding Officer, to test survey equipment and environmental sensors, load and set up equipment, and assemble and modify wooden decking on flying bridge. Loading and set up is currently planned for the 28-30 June.

During the cruise, the temperature of the scientific freezer and refrigerator must be monitored by the ship's engineering staff twice daily, and the Cruise Leader notified in the event of significant changes.

HAZARDOUS MATERIALS

The Chief Scientist shall be responsible for complying with NC Instruction 6280a, Hazardous Materials and Hazardous Waste; policy, guidance, and training, dated February 4, 1991, paragraph 7.g and paragraph 9. By Federal Law, the ship may not sail without a complete inventory of Material Safety Data Sheets (MSDS's) and appropriating neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemicals brought on board. The Chief

Scientist will provide the Commanding Officer with a copy of all MSDS's prior to the cruise.

DATA RESPONSIBILITIES

Collection of Data - The Chief Scientist will receive all original data related to the project, and this data transfer will be documented on NOAA Form 61-29, "Letter Transmitting Data". The Chief Scientist will in turn furnish the Commanding Officer with a complete inventory listing of all data gathered by the scientific party, detailing types of operations and quantities of data prior to departing the ship. All data gathered by the vessel's personnel that are desired by the Chief Scientist will be released to him, including supplementary data specimens and photos gathered by the scientific crew.

Dissemination of Data - The Chief Scientist is responsible for the quality assurance, disposition, and archiving of data and specimens collected aboard the ship. The Chief Scientist is also responsible for the dissemination of copies of these data to cruise participants and to any other requesters. The SWFSC cruise report will be submitted according to SWFSC procedures to appropriate persons and groups.

Evaluation Form - The Chief Scientist will complete the Ship Operations Evaluation Form and forward it to the Office of Marine and Aviation Operations. The Commanding Officer will provide this form.

ADDITIONAL INVESTIGATIONS AND PROJECTS

Ancillary Projects - Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force. Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions. Any additional work will be conducted so as not to interfere with operations as outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the primary project with approval from the Commanding Officer.

COMMUNICATIONS

Radios - The Cruise Leader or designee may request, from the Commanding Officer, the use of radio transceivers aboard the ship to communicate with other vessels and aircraft, if necessary.

SWFSC will supply their own handheld radios for intraship communication and communication with the small boats. However, the Cruise Leader may request the use of the ship's handheld radios if the supplied radios should fail.

A 25 watt Marine Radio with antenna will be mounted on the flying bridge for ease of communication with small boat.

Telephone - The Cruise Leader or designee may require access to the ship's INMARSAT or cellular telephone systems with permission from the Commanding Officer. The Commanding Officer will provide the Cruise Leader with a log of all INMARSAT calls made from the ship for SWFSC business at the end of each leg. In accordance with the Communications Reimbursement Policy dated April 26, 1999, SWFSC will pay these charges via a transfer of funds from SWFSC to the ship.

Electronic Mail - All members of the scientific party will have access to e-mail for communications with persons not aboard the ship. The amount of such communication traffic will be determined by the Chief Scientist.

Routine Reports - The Cruise Leader will submit a weekly cruise report, along with time and attendance for the scientific party, to the Survey Coordinator each Thursday during the cruise via e-mail or, if e-mail is not functioning properly, via fax. The Survey Coordinator at SWFSC will be on the

distribution list for the ship's noon position reports.

MISCELLANEOUS

Underway Meetings - Meetings between the Commanding Officer (and other officers) and the Cruise Leader should occur at the end of each leg to discuss and solve any problems or changes that may arise. Additional meetings should occur as needed during the leg.

Debrief - A postcruise debriefing will be held between the Chief Scientist and the Commanding Officer. If serious problems are identified, the Commanding Officer shall notify the Marine Operations Center, Pacific, in the most direct means available. The Chief Scientist shall document identified problems in the Ship Operations Evaluation Form. The time and date for the debrief will be determined toward the end of the cruise.

Time and Attendance - Time and Attendance will be filled out by the SWFSC timekeeper while the ship is at sea, based on information transmitted by the Cruise Leader to the Survey Coordinator. Scheduled overtime is authorized for Saturdays, Sundays and holidays. Irregular overtime will be authorized by the Cruise Leader as required. SWFSC personnel are authorized per diem at the rate of $ per day to be paid via a travel voucher at the termination of the cruise. Task Number FR7200 XXXXXXX will pay for per diem and overtime for Cruise Leaders and other SWFSC personnel. Regular salary for SWFSC personnel will be paid by the CYOP task from which they are normally paid.

Navigation - Primary control will be GPS, also dead reckoning based on visual bearings and radar ranges when possible.

Scientific Spaces - The Cruise Leader shall be responsible for the proper upkeep and cleaning of all spaces assigned to the scientific party, both laboratory and living spaces, throughout the cruise. The Cruise Leader or Chief Scientist will make berthing assignments for scientific personnel on a per-leg basis, with approval of the Commanding Officer.

Prepared by: _____ Dated: _____
LTjg Jason Appler
Survey Coordinator, SWFSC

_____ Dated: _____
Dr. Richard LeDuc
Chief Scientist, SWFSC

Approved by: _____ Dated: _____
Dr. Michael Tillman,
Science Director, F/SWR